

Remarks

Claims 11 - 29 are pending. Favorable reconsideration is respectfully solicited.

The claimed invention is directed to jointing with sand. In the construction of streets, walkways, driveways, etc., where paving stones, bricks, or tiles are used, sand is commonly swept into the joints between the "pavers" to stabilize them against movement, for example tilting, etc., as the paved surfaces are used by pedestrian, bicycle, or vehicular traffic. In these applications, hydraulic binders such as Portland cement, aluminosilicate cement, etc., are generally not used, since the hard "joint" which results is subject to freeze/thaw cracking, and makes reworking of the paved surface difficult. However, when sand is used alone (sand including small aggregate, pigmentary solids or other finely ground substances in addition to the major silica or limestone component), the sand may be gradually washed away, by rainfall, for example. Applicants have discovered that certain functionalized redispersible powders can be added to dry sand, and the jointing mixture thereby obtained, either in a dry or moist condition, can be swept into the joints between pavers, ultimately setting to a composition which resists erosion by water, yet which can easily be reworked if maintenance is required. Surprisingly, conventional water redispersible polymers fail in this application.

The functionalized redispersible polymer powders used are those specified in the claims as copolymers a) and copolymers b). Copolymers a) are functionalized with post-crosslinking comonomers and stabilized by polyvinyl alcohol as the protective colloid whereas copolymers b) are conventional redispersible polymers functionalized through the use of protective colloids which are polymers prepared from ethylenically unsaturated mono- or dicarboxylic acids and/or their anhydrides.

In addition to these functionalized redispersible polymer powders, the composition may contain pulverulent bifunctional masked aldehydes, preferably also with an acidic additive, when copolymer(s) a) are employed, and a basic additive when copolymer(s) b) are employed.

In Example 1, a polyacrylic acid stabilized copolymer b) was employed, and in Example 2, a polyvinyl alcohol stabilized copolymer a) was employed. In Comparative Example 3, a conventional vinyl acetate/ethylene redispersible polymer powder stabilized by polyvinyl alcohol protective colloid was used. Both Example 1 and Example 2 produced sound joints which prevent erosion, but which still exhibited water permeability, wherein in Comparative Example 3, no binding was achieved.

Claims 21 - 29 have been rejected under 35 USC § 103(a) over Eck et al. U.S. 5,753,733 ("*Eck*"). Applicants respectfully traverse this rejection, as *Eck* does not disclose, teach or suggest the claimed subject matter.

Eck is directed to preparation of redispersible polymer powders which are highly hydrophobic due to a high content of organosilicon moieties. In order to incorporate the large amount of organosilicon moieties, two distinct kinds of organosilicon compounds are employed. The first type is a copolymerizable organosilicon compound. The latter contain both an ethylenically unsaturated free radical polymerizable group and a silicon-containing moiety. Examples are vinyltrimethoxysilane, vinyltriethoxysilane, and methacryloxypropyltriethoxysilane. These are all relatively low boiling point, copolymerizable organosilicon monomers. For example, vinyltrimethoxysilane has a boiling point of 123°C.

The copolymerizable silicon compounds are insufficient to achieve the desired degree of hydrophobicity in *Eck's* redispersible polymers, however, and thus he also includes non-copolymerizable organosilicon compounds having a boiling point greater than 160°C. These may be added at any time prior to spray drying the aqueous polymer dispersion, since they are non-polymerizable in addition polymerization. Example 1 is typical, the redispersible polymer prepared from 6.4 kg vinyl acetate and 7 g of methacryloxypropyltriethoxysilane, stabilized by polyvinyl alcohol protective colloid. To the Polymerizable monomers is also added 320 g isooctyltriethoxysilane, which contains no ethylenic unsaturation and is thus not copolymerizable.

The use of the polymer compositions of *Eck* is in hydraulically settable plasters, renders, screeds, mortars, etc., as disclosed in column 8, lines 25 - 33. All these compositions contain a hydraulically settable inorganic binder, *i.e.* Portland cement, aluminosilicate cement, trass cement, magnesia cement, phosphate cement, gypsum, or water glass. The results of the use is disclosed in the paragraph following (column 8, lines 34 - 42): hydrophobicization resulting in reduced uptake of water or water repellency.

In columns 2 - 3 of *Eck* are listed a variety of conventional monomers and comonomers for preparing the redispersible powders by emulsion polymerization, and in column 6, lines 36 - 54 are disclosed the conventional protective colloids which may be employed when the latter are used in lieu of emulsifiers or dispersants (cf. col. 6, lines 22 - 35).

Claims 11 - 22 are directed to a process of jointing with sand, by mixing functionalized redispersible polymer powder a) or b) with dry sand to form a jointing composition and sweeping the jointing composition in dry or moist form into joints. *Eck* does not disclose, nor does he teach or suggest this process, not the jointing composition of claims 23 - 29. Rather, *Eck* teaches adding his hydrophobicizing powders to joint filler or plaster recipes which include hydraulic inorganic binders and adding water to prepare a pasty spreadable composition, followed by setting.

The independent claims have been amended to recite that the jointing composition contain at least one polymer powder binder which "consists essentially of" the copolymer(s) and a) and b) optional ingredients c) and d) as the binder, thus excluding the use of any appreciable amount of inorganic hydraulic binder which is functionable as a binder. This limitation alone patentably distinguishes from *Eck*, all of whose end use products contain binding amounts of hydraulic mineral binders such as white cement. However, it is noted also that *Eck* teaches only water-based compositions in the form of conventional spreadable plasters or mortars, *i.e.* of paste-like consistency, not a dry or moist composition which can be swept into joints by brooms or the like.

Furthermore, *Eck* teaches a wide array of copolymers as the redispersible polymers without directing one skilled in the art to the specific functionalized copolymer redispersible powders claimed, and all his products additionally contain non-polymerized organosilicon compounds, which Applicants' claimed products do not contain.

Applicants have shown by their Comparative Example 3 that functionalized polymers in accordance with the claim are necessary for their unique application, where the jointing composition is applied dry or moist, whereas other redispersible polymer powders such as that used in Comparative Example 3, fail to provide any consolidation.

Finally, it is not Applicants' desire to produce hydrophobic compositions. One of the principle advantages to the use of jointing sand is that it allows surface water to drain through the joint to the ground below. If this were not the case, puddles would collect and runoff would be completely horizontal, into gutters and storm sewers, for example. One skilled in the art would not be motivated to look to *Eck* for a composition to be used in sand joints for that reason: hydrophobicity is undesirable, yet it is *Eck's* purpose to include large amounts of organosilicon compounds in his products just for that purpose. The amounts of copolymerizable organosilicon monomers which can be used are insufficient for *Eck's* purpose, so he adds non-copolymerizable organosilicon compounds to make the polymers truly hydrophobic.

Withdrawal of the rejections of the claims over *Eck* is solicited for the above reasons.

Claim 13 restricts the copolymers (a) to those containing N-methylolacrylamide or N-methylolmethacrylamide as post-crosslinking monomers. *Eck* requires a copolymerizable organosilicon compound which this claim does not allow. The same is true of claim 25. These claims are separately patentable for this additional reason.

Claims 18 and 19 require use of a copolymer b), with polymers containing 80 - 90 mol% of acid groups as the protective colloid. *Eck* does not disclose, teach, or suggest this

additional claim limitation, nor would it be obvious to make this selection. These claims are separately patentable for this reason.

Claims 20 and 26 further require at least one bifunctional masked aldehyde. The aldehydes cited by the Office on page 5 of the Office Action, and mentioned briefly by *Eck* in column 6, lines 59 - 62 are molecular weight regulators, and are not masked. They are used during preparation of the polymer by emulsion polymerization, and as is well known, are always removed from the completed polymer by sparging, treatment with steam, volatilization at low pressure, washing, or a combination thereof. By contrast, the compounds of claims 20 and 26 require addition of a difunctional masked aldehyde. The blocked aldehyde groups "demask" during cure to crosslink with functional groups of the polymer. *Eck* does not teach or suggest such compositions, and his aldehydes, which are not masked, are added to an aqueous emulsion or dispersion, not to a dry or moist jointing composition. These claims are separately patentable.


Claims 21 and 22, 26 and 29 all require either a pulverulent basic or pulverulent acid additive. *Eck* discloses adjusting the pH of an aqueous dispersion to an optimal pH for emulsion polymerization. However, *Eck* does not teach or suggest adding a pulverulent acid or base to the dry polymer after it has been prepared, nor would one be motivated to do so. Any pH adjustment by *Eck* is performed during polymerization. These claims are separately patentable.

The corresponding European patent application has been granted. While Applicants' attorney is aware that a grant in another jurisdiction is not dispositive of patentability in the U.S., particularly in view of differences in what does and does not constitute prior art in the U.S. versus other jurisdictions, the grant in Europe is particularly persuasive since the European requirements of novelty and non-obviousness (lack of invention) are very similar as between the United States Patent and Trademark Office and European Patent Office.

Applicants submit that the claims are now in condition for Allowance, and respectfully request a Notice to that effect. If the Examiner believes that further discussion will advance the prosecution of the Application, the Examiner is highly encouraged to telephone Applicants' attorney at the number given below.

The Petition fee of \$120.00 is being charged to Deposit Account No. 02-3978 via electronic authorization submitted concurrently herewith. The Commissioner is hereby authorized to charge any additional fees or credit any overpayments as a result of the filing of this paper to Deposit Account No. 02-3978.

Respectfully submitted,
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